UNIT 8 Space & Exploration

Reading 1 Spin-Offs From Space

Spin-Offs From Space

There are people who think that countries are wasting their money when they invest in space programs. They say that the money should be used to improve the quality of life on Earth. What they might not know is that missions into outer space have helped improve the quality of life here on Earth. Technology, materials, and devices that were first developed for use in space are now helping people every day. These items are called "spin-offs."

NASA's labs have produced various technologies that we now find around us every day. ① The lightweight metals used in modern tennis rackets are one example. NASA also developed metals that have a "memory." When these metals are bent, ② they return to their original shape. We use ③ them in eyeglass frames to make ④ them flexible and sturdy. Eyeglasses also utilize another NASA development: ⑤ scratch-resistant lenses. And the shock-absorbing materials originally developed for moon boots are now used in all kinds of athletic shoes.

1. Choose the one that has a different connotation from the others.

① ② ③ ④ ⑤

2. What is the most suitable main idea of the passage?

① Space exploration is a waste of money.
② Each country needs to invest greatly in its space technology.
③ There are innumerable innovations that benefit our lives on Earth.
④ Space technology has greatly contributed to improving life on Earth.
⑤ Right now life on this planet is much more significant than space research.

A thermometer pill was designed ① to be swallowed by astronauts in order to monitor their body temperature ② during missions. Now it helps serious athletes ③ prevent dangerous ④ heat-relating illnesses while training or competing. NASA produced advanced robotic arms for repairing the International Space Station, and similar robots are helping doctors ⑤ to make surgery simpler and safer.

3. Choose the words that best complete the summary of the passage.

____(A)____ has made progress in ____(B)____.

	(A)	(B)
①	Space research	health and safety
②	Space research	physical development
③	Medical research	bioecology
④	Medical research	sports and safety
⑤	NASA	the medical profession

4. Which of the following is grammatically incorrect?

① ② ③ ④ ⑤

Other spin-offs have _____ benefits. Some NASA innovations help reduce energy use. In the 1990s, ____(A)____, NASA was trying to build uncrewed, solar-powered aircraft that could fly for days. These machines required efficient solar panels that did not weigh too much. Engineers on the project developed the single-crystal silicon solar cell, which provides up to fifty percent more energy than other solar cells. These efficient cells are now widely used for clean power in homes and businesses. ____(B)____, homeowners can save energy by using thin insulation that was first developed for use in space. Thin insulation is more efficient and easier to install than traditional insulation.

5. Choose the word that best fits in the blank.

① economical
② psychological
③ biological
④ physical
⑤ ecological

6. Choose the correct words for (A) and (B).

	(A)	(B)
①	therefore	Likewise
②	therefore	As a result
③	in addition	Therefore
④	for example	Nevertheless
⑤	for instance	In addition

Other technology developed for space can directly make our environment cleaner. Water is precious in space, so researchers have developed a process for getting drinkable water from astronauts' breath, sweat, and urine. People in many developing countries struggle ① finding safe drinking water. Now they can make use of NASA's process to clean up their local water sources. ② The other spinoff, the Petroleum Remediation Product (PRP), has changed the way ③ that we clean up oil spills. PRP is made up of tiny balls of beeswax that draw in the oil and trap it. Then bacteria feed on the oil until it ④ will be no longer dangerous to living things.

These are only a few of the 30,000 space innovations that benefit our lives on Earth. There will always be people who oppose space exploration, but if they say it wastes money, ⑤ reminding them that life on this planet is better in many ways due to space research.

7. Which of the following is grammatically correct?

① ② ③ ④ ⑤

8. What is NOT true, according to the passage?

① Space innovations certainly have environmental benefits.
② On space, astronauts' sweat and even urine is collected and recycled as drinking water.
③ NASA created water filters to help developing countries get safe drinking water.
④ PRP helps increase the efficiency of oil eating bacteria.
⑤ Not everyone is in favor of space exploration.

Science Fiction of Science Fact?

Decades before humans traveled in space or walked on the moon, science-fiction writers were selling stories about such events. These authors invented incredible devices in their tales. Some of these very science-fiction devices are used by people today.

Maybe the best example is one from Howard Fast's 1959 story, "The Martian Shop." In the story, Fast describes a device with speech-recognition capabilities. These days, speech recognition is widely used on smartphones. Fast also describes a tiny music box that can remember vast amounts of music—just like today's mobile devices.

In 1958, author Isaac Asimov wrote about a calculator (A) [small enough / enough small] to hold in one's hand. Remember that in those days, there were no home computers, no digital cameras, and not even calculators. About twenty years after Asimov wrote the story, calculators became available.

Robert A. Heinlein was both a science-fiction author and inventor. He worked with the US Navy to develop a pressure suit for underwater use. This technology (B) [was led / led] almost directly to the development of space suits. But twenty-one years before anyone walked on the moon, Heinlein published a story about this very technology!

The next time you see some amazing new invention in a science fiction movie, imagine (C) [using / to use] it in real life. Only time will tell if it is indeed science fiction or science fact.

9. Choose the grammatically correct words.

	(A)	(B)	(C)
①	small enough	was led	using
②	small enough	led	using
③	small enough	was led	to use
④	enough small	was led	using
⑤	enough small	led	to use.

10. What is most likely the title of the paragraph?

① The Best Inventions: From Science Fiction
② Science Fiction: Prophets?
③ The Techniques of the Time Used in Science Fiction
④ Famous Science Fiction Authors
⑤ Ingenuity: Essential for a Science-fiction Writer

Reading 2 A New Space Race

A New Space Race

In the 1950s and 1960s, the United States and the USSR were engaged in a race to dominate space exploration. The USSR launched the first man-made satellite, Sputnik, into orbit around the Earth in 1957. In 1961, it also became the first country to put a man in space. Then, in 1969, the United States put the first man on the moon. Feelings of nationalism thus turned space into a political arena, not just a scientific one. In the 21st century, however, a new space race has emerged: the one for commercial space travel.

11. Which of the following is the most suitable title of the passage?

① A New Space Race
② The Beginning of Space Race
③ The Political Effect of Space Race
④ The World's First Artificial Satellite
⑤ The Forefront of the New Space Tourism

12. What is most likely the topic of the paragraph that comes AFTER the given text?

① Countries in the space race
② The requirements for the first space traveler
③ The importance of launching commercial space travel
④ The prosperity of the communications satellite business
⑤ The beginning of a competition for commercial space travel

(A) [During / For] decades, the only people to fly into space were government astronauts. But in April 2001, an American engineer and businessman (B) [named / naming] Dennis Tito became the first space tourist. He paid the Russian Federal Space Agency a huge amount of money—$20 million, reportedly—for a rocket ride to the International Space Station (ISS). (NASA did not approve.) Three years later, Mike Melvill (C) [has become / became] the first astronaut to pilot a spacecraft for a private company. He took SpaceShipOne to the “edge of space”—one hundred kilometers above the Earth’s surface.

13. Choose the grammatically correct words.

	(A)	(B)	(C)
①	For	named	has become
②	For	naming	became
③	During	named	has become
④	For	named	became
⑤	During	naming	became

14. Which of the following is NOT true about the passage?

① It wasn't until early 2001 that civilians could travel into space.
② Dennis Tito is the world's first space tourist to fund his own trip into space.
③ Dennis Tito paid $20 million to fly to the International Space Station in 2001.
④ SpaceShipOne is the first privately funded spacecraft Mike Melvill patronized.
⑤ Mike Melvill piloted SpaceShipOne on its first flight to the edge of space in 2004.

The company that made SpaceShipOne was one of twenty-six firms from various countries competing to win the Ansari X-Prize.

(A) After its first flight in July 2004, SpaceShipOne made two more trips into space in early October 2004, thereby winning the prize.

(B) The assignment: become the first commercial group to send three people into space twice within two weeks, in the same vehicle.

(C) This was a $10 million award established by donors in order to motivate private companies to develop spaceships.

15. What is the correct order of the paragraphs after the given sentence?

① (A)-(C)-(B)
② (B)-(A)-(C)
③ (B)-(C)-(A)
④ (C)-(A)-(B)
⑤ (C)-(B)-(A)

16. Which of the following cannot be answered from the passage?

① Who won the Ansari X Prize?
② Why was the Ansari X Prize designed?
③ How many countries participated in the Ansari X-Prize?
④ How much was the winner's prize of the Ansari X-Prize?
⑤ What were the requirements to join the competition the Ansari X-Prize?

The Ansari X-Prize was ① inspired by the beginnings of aviation history. In the early days, private persons and companies, not governments, ② pioneered air travel, pushing the boundaries of what was possible at that time. Take, _____(A)_____, the pilot Charles Lindbergh. In 1927, he won the $25,000 Orteig Prize for making the first solo flight across the Atlantic Ocean.

Since those first thrilling flights, hopes have been high for private space travel to ③ replicate the success of private air travel. Numerous entrepreneurs are competing for the top spot in the commercial sphere. Elon Musk's company, SpaceX, built a multi-purpose craft called the Dragon, and in 2012 it became the first commercial space vehicle to dock with the ISS. But it only carried equipment, not people. So far, only a handful of companies, including Richard Branson's Virgin Galactic, offer to take paying customers on flights. And they can only do so with the help of Russia's space agency. SpaceX wants to ④ change that. It has announced plans for four private missions on its own spacecraft to take place over the next several years.

Today, space tourism is still only an option for the very rich. A Virgin Galactic ticket, _____(B)_____, costs $250,000. But the price may ⑤ go up as technology improves. One thing is for sure: we are witnessing a whole new space race.

17. Which of the following is NOT suitable to the context?

① ② ③ ④ ⑤

18. Choose the correct words for (A) and (B).

	(A)	(B)
①	however	for instance
②	for example	however
③	for example	for example
④	moreover	accordingly
⑤	however	accordingly

Life on Mars?

Mars is our closest neighbor in the solar system and has been studied by humans for hundreds of years. It was named after the Roman god of war because its red color ① reminding ancient people of blood.

The first spacecraft to visit Mars, Mariner 4, orbited the planet in 1965. Several other space missions followed, including Mars 2, the first spacecraft to actually land on Mars. Over the years, missions to Mars have continued, with one of the most interesting ② is the *Phoenix* lander, which landed on the northern plains of the planet in 2008 to search for traces of water. This mission was particularly important because finding water increases the possibility of finding evidence of life. There ③ being no known life on Mars now, it would be amazing to discover that there was life in the past.

Phoenix had special equipment that was able to dig into the hard clay soil of Mars, ④ analyzing a sample of the soil, and send the results back to Earth. Fortunately, it did not have to look far to find a soil sample that contained water—directly below *Phoenix* was a chunk of ice! Scientists concluded that it was very similar to Earth ice. In 2012, Curiosity landed on Mars and provided further hope that the planet might be suitable for life. It found nitrogen, oxygen, carbon, and other substances that ⑤ considered "building blocks" of living things. The search for life, past or present, goes on. A craft called Perseverance landed on the red planet in 2021 with the goal of building on previous discoveries.

Martian life may be nothing more than microbes. But the discovery of any form of life there would be very exciting. It would mean we had Martian "cousins"—even if they were just tiny bacteria.

19. Which of the following is grammatically correct?

① ② ③ ④ ⑤

20. Which of the following is NOT true according to the passage?

① Humanity has launched a myriad of missions to Mars to explore more about our planetary neighbor.
② The reddish color of the planet Mars led the Romans to name it after their god of war.
③ It was *Phoenix* that confirmed the building blocks for life as well as the presence of water ice on Mars.
④ The discovery of water is associated with finding the organic materials.
⑤ What Curiosity found further boosted hopes that Mars could be suitable for life.

Answer Key

1. ④

2. ④

3. ①

4. ④

5. ⑤

6. ⑤

7. ③

8. ③

9. ②

10. ②

11. ②

12. ⑤

13. ④

14. ④

15. ⑤

16. ⑤

17. ⑤

18. ③

19. ③

20. ③